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ABSTRACT

The report consists of 3 parts: (1) a quantitative analysis of the history of psychological gerontology based upon the reconstructed flow of written information in reference networks; (2) a supplement to this analysis which focuses especially on "underdeveloped" areas not represented in the networks; and (3) a wide-ranging inquiry into contemporary concepts of research and theory, communication and education and, more generally, our concept of man and society. The author's search uncovers an enormous amount of wasted research effort and a concurrent lack of investigations of significant issues. As a result, he recommends: (1) a shift in emphasis from accumulation to integration in data collection; (2) implementing this shift through an overhaul of our system of higher education ; (3) new applications of theories and techniques aimed at coping with information overload such as that which exists in psychological gerontology; and (4) a reformulated model of man, based on his dialectic, developmental interdependence with the changing society. In essence, the author feels that higher educational competitiveness has resulted in information overloads which support one or another fragmented models of man and society. (Author/TL)

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On the History of Psychological Gerontology*

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The following report consists of three parts. First a quantitative analysis of the history of psychological gerontology will be given based upon the reconstructed flow of written information in reference networks. Second, this analysis will be supplemented by more traditional, idiographic interpretations, focusing especially upon those "underdeveloped" areas not represented in the networks, and deducing conclusions from comparisons with the general areas of psychology and of developmental psychology. Third, in view of the enormous amount of wasted research efforts (part 1) and the concurrent lack of investigations of significant issues (part 2), questions need to be raised concerning our concepts of research and theory, communication and education, and more generally, our conception of man, society, and their development. Because of the severe time limitations imposed only parts 1 and 3 will be presented at this time; the discussion of part 2 will be almost completely excluded.

Quantitative Analysis of the History of Psychological Gerontology

The reference files of the present author on the literature of psychological gerontology prior to 1958 (Riegel, 1958-59) were supplemented by adding all entries which appeared under the heading "Psychological Processes" in Shock's

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classified bibliography of gerontology (1951-57) or in the Journal of Gerontology up to the last issue of 1970. The expanded reference file represents our data basis from which simple statistical findings were derived. More important, it was used for a reference retrieval analysis which studies the organization and flow of information in psychological gerontology over the last 85 years.

For such an analysis and because of the limitations in our research we had to rely on one lead article only. The article by Blum, Jarvik, and Clark (1970) represents a top node point of a root structure going backwards in historical time. In order to explore this structure, we coded and transcribed upon the corresponding card all the references made to earlier publications and meeting the criteria mentioned above. Notations to the node publication of the last filial generation were also always made on all the reference cards of the preceding parental generation. Some of the concepts used are demonstrated in Figure 1.

After the first generation of references were recorded on the file cards, each of the references became a new node point and the second generation references became a new node point and the second generation references were transcribed. This process was continued until the earliest period of retrievable references was reached, i.e., the compounded period prior to 1919.

(1) A first and rather simple finding concerns the increase in the number of publications in psychological gerontology with historical time. These data, plotted as averages for two-year intervals, are shown in Figure 2.

Beginning at the turn of this Century and continuing until World War II, a steady increase in the number of publications occurred. Thereafter, during a short period, further acceleration was halted, but with the end of the War a steep increase took place which has not faded out yet. In 1968, the last year for which (at the present time) a rather complete estimate of the number of publications can be obtained from Shock's listings, a total of 235 publications in

psychological gerontology were recorded which met our criteria for inclusion. The total number of reference cards placed in our file equals 4310.

(2) A second question concerns the percentages of items picked up through our retrieval analysis. Starting with only one lead article in 1970, we should expect a marked increase in percentages during the preceding decade. The further we go back in time, however, the more likely it should become that several writers converge upon the same source. The detection of these key nodes and their sequential dependencies represents one of the major goals of our analysis.

As shown in Figure 3, the whole decade of the 60's represents the period during which our retrieval network shows a rapid expansion. A total of 261 references are made to 91 of the 282 publications of the two year period of 1958-59, i.e., many references are made to the same sources repeatedly. Fewer references are made to publications of the earlier years, i.e., the curve is distinctly skewed to the right. These findings are likely to be dependent upon the citation habits of psychological gerontologists. For instance, we might expect that present day behavioral scientists lack historical perspective and/or are forced by the editorial policies of some journals to make only a few and superficial references to closely related publications, most of which might precede the author's own publication only by a few years. In contrast, former-day behavioral scientists are often thought to be familiar and concerned with large portions of the literature and to be inclined to explore these sources thoroughly and exhaustively. Consequently, the average citation span might be longer for early authors and might have shrunk with historical time. As a further consequence, the length of the survival period, the "half-life" of publications (Price, 1965), might have decreased with historical time. Thus, while we are producing much more than in former days, we are also disposing larger proportions of our products after a

short period of time. It is not unlikely that thereby we are wasting a good deal of our efforts and pollute our channels of communication.

A tentative answer to these issues can be obtained by computing the percentages of retrieved items per total items as a function of historical time. As shown in the upper section of Figure 3, these percentages fluctuate slightly around the overall average of 23% during the period from around 1920 to 1960. Thus, our lead article of 1970 directs us toward slightly less than one-quarter of the total literature in psychological gerontology. The study of retrievals originating from other lead articles would show us whether additional portions of the unaccounted 77% of the literature will be brought into the retrieval system or whether this portion, essentially, represents publications that either never linked up with the mainstream of the references network or did so for a short period of time only.

(3) In order to analyze the present and past citation habits of psychological gerontologists, we determined the average number of references (meeting our criteria) and the average year of these citations per publication. When computed for two-year periods, the results of Figure 4 were obtained.

Contrary to our expectations, the number of citations per scientific article increase with historical time. Also the average citation span shows a highly consistent upward trend. As the number of references increases with historical time (see lower part of Figure 4), the period covered through these references increases as well (see upper part of Figure 4). Thus, contrary to our expectations, authors do not necessarily change their citation habits. Certainly, modern authors have not become more contemporaneous in their orientation than former scholars. Most likely, the increase in citation span has to be attributed to the historical growth of the repertoire (represented by our card file) from which

authors can select their references. Former scholars had only a few relevant items to choose from; a modern writer can select from the total file of 4310 items.

The data points in the upper section of Figure 4 fall closely upon a straight line represented by the following regression equation:

$$y = .89\ x + 208.43.$$

The corresponding correlation coefficient equals 0.98. According to this equation, the citation lag equalled about eight years in 1960, i.e., the references cited in articles published in 1960, on the average, had appeared around 1952. In 1940 the citation lag was only five years long.

By extrapolating the equation down to the intersect with the major diagonal of the system of coordinates, (i.e., to the intersect with a line that originates at year 0 and has a slope of 1.0), it is possible to determine that point in time at which a writer in psychological gerontology would refer only to contemporaneous authors, most likely to himself. This point is found at the year 1895 and can be considered as the origin or zero-point of psychological gerontology. Searching through the few publications of the corresponding decade, we find the following entries:

Richardson, B. W. Memory as a test of age, 1891
Savage, G. H. Symptoms of mental dissolution, 1893
Scott, C. A. Old age and death, 1896

Underdeveloped Areas in Psychological Gerontology

A detailed description of the reference network extracted from our file and hinged upon the lead article by Blum, Jarvik, and Clark (1970), cannot be presented at this occasion. In any case, such an analysis is far from complete. It

needs to be extended by emphasizing topics other than those of intellectual achievements to which we were directed by the selection of our lead article. Through such extensions we would become able to determine how many of the previous studies have become obsolete or have never entered into close and repeated connections with the mainstream of publications in psychological gerontology. In particular, we would be able to determine how many of the 77% of unaccounted publications would enter into the retrieval system. In order to maximize the possibility for inclusion, we should choose additional lead articles as divergent from one another as conceivable.

But even if we had extended our retrieval system in such a manner, we can still not be sure whether or not some of the remaining publications represent significant topics of inquiry. All we learn is that, thus far, they have not been recognized as important issues. Intuitively we might be convinced that, indeed, lack of recognition rather than irrelevance of the topics are often the prevailing condition which determine success in psychological gerontology as well as in psychology in general. All too often are our activities and, more important, the recognition of these activities guided by the well established and documented trends in a given field; all too rarely are we sensitive enough to detect newly emergent trends and to support them intellectually, financially, and through our editorial decisions.

In order to identify such developments and innovating research activities at early dates, it remains necessary, at the present time to retreat from our quantitative study of the history of psychological gerontology to approaches analyzing these issues in a more traditional manner. By inspection and evaluation of the existing literature and by comparing it with the area of psychology in general and with developmental psychology in particular, we might detect new trends, as well as identify "underdeveloped" and "overdeveloped" areas. Through additional quantitative studies of the type presented here, supplemented by

elaborations of theoretical issues and methods, we might eventually succeed, however, in deriving such deicisions without interpretative evaluations or at least, we might derive these decisions from a well founded data base which is open to public inspections.

In order to achieve such a goal, our procedures do not only need to be extended and mechanized but more sophisticated methods and models have to be developed. The planning involved in such a task would also force us to perform the analysis, to study the history of psychological gerontology, in a prospective manner. Concretely speaking, our reference system would have to be supplemented as soon as new material appears in print rather than several years after its publication and by means of retrospective retrievals. Abstractly speaking, we have to develop a new sense of history. As forcefully emphasized by Lynd (1970), history for all too long, has led us to contemplate about the past but has done little to guide us into the future. Historical studies as described and envisaged here would lead us in this direction.

Conclusions

Our quantitative analysis of the history of psychological gerontology can be regarded as an effort in futility. On the one hand it represents another addition to the legion of studies; on the other hand it demonstrates that the vast majority of these studies represent nothing else than an enormous waste of our efforts. How can we prevent this pollution from spreading further? How can we make our human and scientific efforts more efficient?

Numerous people and organizations have become deeply concerned about these problems. Not all of them are ready to admit, however, that any solution has to revolutionize the very basic conceptions of knowledge and science. Most of them still believe that with increased efforts and with the allocation of additional

funds our problems can be resolved. In contrast to such optimistic views, I have to maintain that basic reformulations are necessary in our conceptions of knowledge and science, research and theory, education and implementation, and generally in our conception of man, society and their development.

(1) In spite of the enormous increase in research output add in spite of our pride in the advancement of knowledge, superficially seen as the result of this increase, our concepts of research and theories have not advanced beyond viewpoints of the 19th Century. We firmly believe that each of the many studies contributes at least a small bit to our stock of knowledge and, thereby, strips nature of another secret. We call these efforts the "collection of facts" and wait patiently for some exceptional scientists to put these "facts" together and, thereby, to "discover" another "law of nature." By disregarding or rejecting non-scientific influences, psychologists have remained safely hidden in their ivory towers and have escaped to the perceptual-structural criteria of knowledge (Riegel, 1972ab). "Truth" has been regarded as dependent upon the degree to which sensory impressions (both of the common-sensical or scientific-observational type) match or are congruent with systematic and, perhaps, formal models. By demonstrating such isomorphism, we continue to believe that we are describing and explaining nature as it "really is." Little do we recognize that both our observations as well as the theoretical models proposed are selectively dependent upon social, economic, and political conditions of the society in which we happen to live. Since considerations like these are outwardly rejected by most present-day psychologists, we have prevented the development of our conceptualizations and remain unable to discuss these issues in a systematic manner. At the same time, we do not hesitate, however, to indoctrinate our students with our biased viewpoints and it is only the new cohort of students which shows a growing sense of uneasiness in regard to our conceptions.

(2) Students of psychology upon entering university programs are explicitly or implicitly forced to engage immediately in research activities and to accumulate set os inappropriate techniques, e.g., statistical techniques of parametric types. These activities may not be damaging as long as we regard them as tasks, almost in a therapeutic sense, which provide opportunities to the individual for gaining scientific insights and human understanding (of course, the latter might be achieved more readily by sending the student into a school, into a home for the aged, or into the ghetto). These tasks are likely to become harmful, however, because they induce upon the student precisely the same attitude toward science which we have criticized already, i.e., the conviction that his activities are not merely of educational benefit for the student himself, but that they also contribute to the growing stock of scientific knowledge.

Perhaps students are selectively attracted to the behavioral sciences because of their preference for such conceptualization. Certainly we reinforce this attitude throughout undergraduate and graduate education. At least from the time of their admission and continuing throughout their whole academic career most psychologists seem to retain this attitude. The outcome is the enormous mass of research, compounded by rejection rates of up to 80% with which editors of leading psychological journals, with an ambivalent feeling of despair and pride, turn down the reports of the activities submitted to them -- despair, because they might destroy with a brief notice the ceaseless efforts and hopes of another individual; pride, because the high rejection rate signals to them the exceptional attraction of their journal, the astounding activities of the field, and the high standards presumably attained. To the present author however, these conditions, much like a continuing unemployment rate of 6% in the wealthiest nation on earth, indicate some very basic fallacies of the system of scientific activities which can be corrected only through major changes in our con-

ceptualization of sciences, implemented through major modifications of our system of higher education.

Such modifications ought to be brought about by an emphasis upon cooperation rather than competition between individuals, upon quality rather than quantity of scientific products, and upon integrative-structured rather than specialized-isolated achievements. Instead of setting each student and each scholar on his own track, we should induce them at the undergraduate and graduate levels to engage in group efforts, not in order to increase their productivity further but to direct them toward integration of efforts and in order to reduce the mass of separate contributions. Additional emphasis should be given to the reanalysis and reinterpretation of previous data, to surveys of literature, and to historical studies. As proposed by Looft (1971), we ought to generate a better psychology but not a "psychology of more and more."

(3) Within the established quarters of the behavioral and social seiences, our suggestions concerning undergraduate and graduate education might appear as anti-scientific. By emphasizing the quality and integration of achievements rather than by evaluating progress through the number of studies produced we do not want to deny, however, the usefulness of data collection. Indeed, our quantitative exploration of the history of psychological gerontology may serve as a demonstration of how quantitative comparisons can assist us in our tasks of achieving a fuller integration and quick decisions regarding future directions.

In the preceding section we emphasized a reduction in research output for the sake of structural, comprehensive integrations. We argued that such a reorientation has to be implemanted through changes in the approach to and in the goals of higher education. In the present section, we are arguing for the application of theories and techniques developed through research on computerized retrieval methods and on models of changing social systems. Such applications aim

at coping more efficiently here and now, with the information overload existing in most scientific disciplines, such as in psychological gerontology. The research and the models may enable us to develop a more rigorous form of conceptualization, to gain an understanding of the dynamics of growing scientific disciplines and, concretely to make us aware of newly emerging trends, of needs for consolidating different coexisting branches, or of splitting apart others which are as yet insufficiently differentiated.

Undoubtedly, the techniques for which these investigations have become known, do not solve the problems intrinsic to our rapidly expanding scientific disciplines. They may enable us, however, much like the recording devices for air or water pollution, to recognize points of saturation or catastrophies. The solutions for these problems, as we have stressed before, have to come through reorientations of the participating scientists and through reevaluations of our scientific discipline leading to a new conception of man, society and their development.

(4) Traditionally, behavioral scientists have been bound to a conceptual model in which both the organism as well as the environment are regarded as passive. This model is the heritage of the sensualistic, elementaristic, and associationist tradition of British philosophy and has been most clearly preserved through the studies of verbal learning and behaviorism. As a theory of man, society and their development, such a model is as insufficient as the modified version proposed by Skinner in which the experimenter actively manipulates and shapes the course of the individual's development. Since in this modified version, the organism remains to be regarded as a passive black-box, and since the activities of the experimenter are arbitrary and idiosyncratic but do not reflect the cultural-historical directions of society, this modification is as insufficient as is the model of the passive organism in a passive environment.

It is the outstanding achievement of Piaget, followed by Chomsky, to have returned activity to its origin, namely into the organism. Learning and development are not considered any longer as being brought about by the organism's exposure to and accumulation of bits and pieces of information and habits, but the organism actively and selectively explores his environmental possibilities. While thus the organism learns only what he explores, this interpretation essentially fails to consider that the environment as well consists of individuals continuously interacting with the developing organisms in an active manner. To Piaget and especially to Chomsky, the environment merely provides the necessary material from which the individual can make his selections; the environment does not impose its information upon the organism. If individuals were living in a social vacuum they could not make such selections and, thus, could not develop.

Psychological gerontologists would have much to learn from Piaget and Chomsky because, there can be no doubt, the idea of an active, aging individual has not yet attained a respectable place in our thinking. But more important yet, psychological gerontologists would have much to learn from Soviet psychology, where, for the first time, also the socio-cultural environment is being considered as an active force in the individual's development.

The dialectic psychology initiated by Vygotskii (1929, 1962) and brought to its fruition by S. L. Rubinstein (see Payne, 1968), considers both the organism and the environment as active participants in a process of changes. Psychic activities or behavior are the outcome of two interaction processes; one relating them to the internal biochemical processes, the other to external cultural-historical processes. The analysis of the first interaction process relies on Pavlov's work on the first and second signalling systems. The development of such a system of nervous activities does not emerge in a social vacuum, however. In the ontogenetic sense it occurs for a particular individual in a particular

social-educational setting; in the phylogenetic sense Pavlov's theory itself is the product of a particular society in a particular cultural-historical setting. The psychic activities developing in the organism will change the cultural-historical conditions, as much as cultural-historical developments will change the psychic activities of the individual. These changes characterize the second interaction ysystem.

Since the cultural-historical conditions are the product of continuing efforts by generations and generations of individuals, it is not surprising that in his own development an individual is bound to generate essentially similar products as those generated in society, e.g., cognitive or syntactic structures. In other words, the problem of nativism-empiricism does not exist; ontogenetic and phylogenetic progressions converge. Similarly, the problem of consciousness versus behavior (mind/body) does not exist. Both are constructs emerging through the two types of interactions; one founded in the external cultural-historical, the other in the internal biochemical conditions. Only in the mechanistic or idealistic views of Western philosophy do these two constructs appear as separate entities, i.e., they appear as behavior if the first system is emphasized at the expense of the second, and as consciousness if the reverse reasoning is applied.

Finally, behavior or consciousness, as seen from such a dialectic view, are psychic activities that are not only being changed by biochemical and cultural-historical conditions but which, in turn, might change both these conditions. This conclusion indicates far reaching revision, namely the rejection of naive realism and scientific fatalism insensitive to social issues and problems. Knowledge and science not only rely on sensory-structural truth criteria but also on those of social actions and consequences. If we were able to conceptualize this problem distinctly, and if we were to succeed in applying it to psychological gerontology, we would attain knowledge in the true and only sense of the word.

Recommendations

The many words of the preceding pages may be summarized as follows:

(1) Deemphasize the ceaseless accumulation of research data which are more important for the competitive success of individuals than for the growth of knowledge, science and society. Emphasize integrative and historical perspectives rather than the collection of bits and pieces of research guided by a naive, fact-finding attitude.

(2) Implement these changes through an overhaul of our system of higher education. Rather than creating over-ambitious, competitive young scientists, often arrogant and elitistic in their thinking, foster an attitude of cooperation and sensitivity toward scientific issues, social problems and people.

(3) In order to cope with the present day scientific pollution, make maximum use of modern technologies and models of the growth of scientific disciplines and society rather than having the fate of their participating members, of human beings, determined by and subordinated to the advances of these technologies.

(4) In order to achieve such intellectual control, formulate a model of man in which his dialectic, developmental interdependence with the changing society is emphasized. Such a model overcomes the naive fact-finding orientation, the mechanistic reductionism, the static dichotomization into nature-nurture or body-mind, and the view of man and of society as passive aggregates shaped by blind external forces.

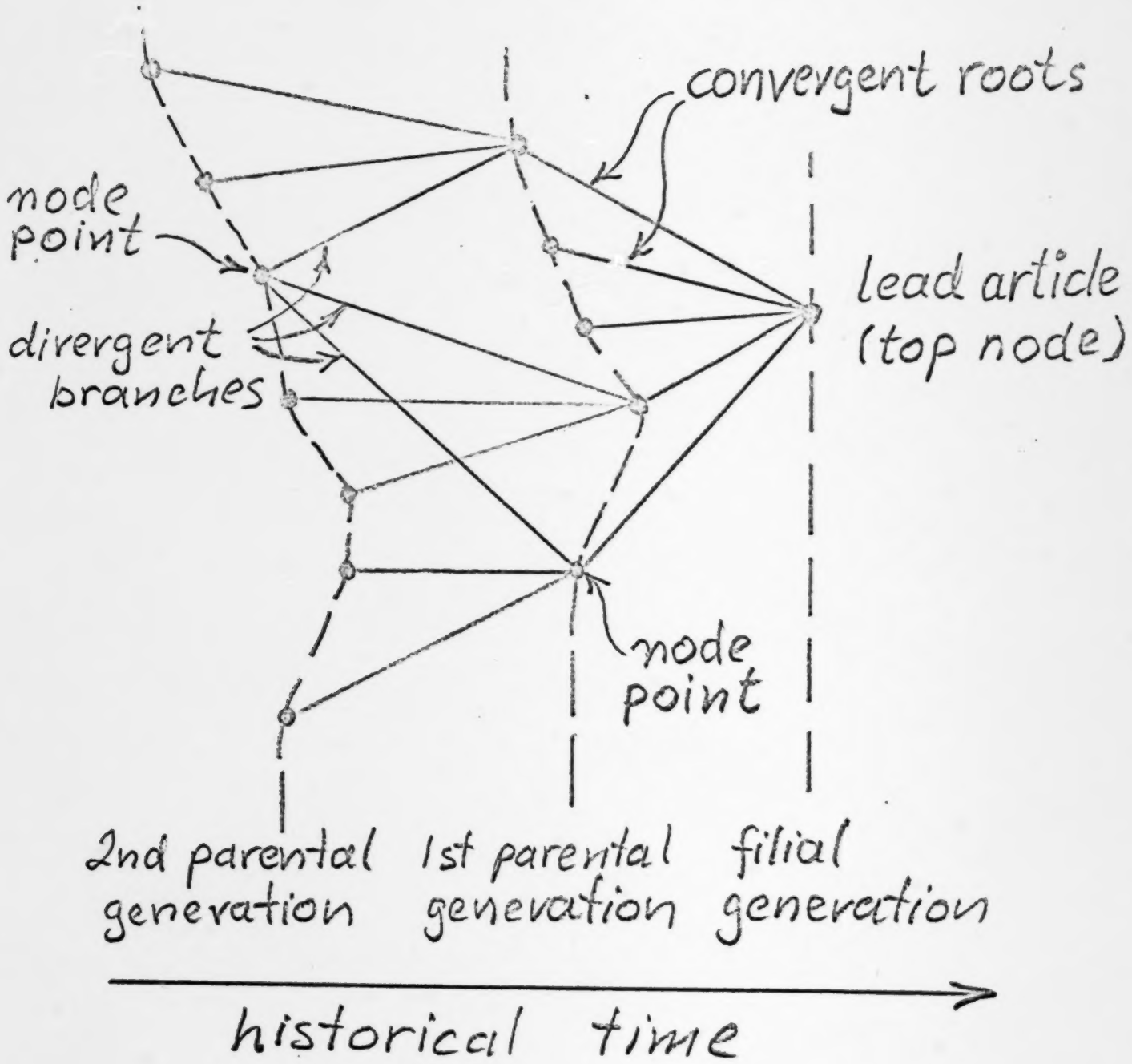

FIG. 1 Subsection of reference network for the description of technical terms. (Note: The denotation "convergent" and "divergent" hold only when we consider the progression as preceding from left to right, i.e., foreward in historical time. In case of a retrospective analysis we have to speak of "divergent roots" and "convergent branches". These denotations - in other words - are dependent upon the interpretation applied).

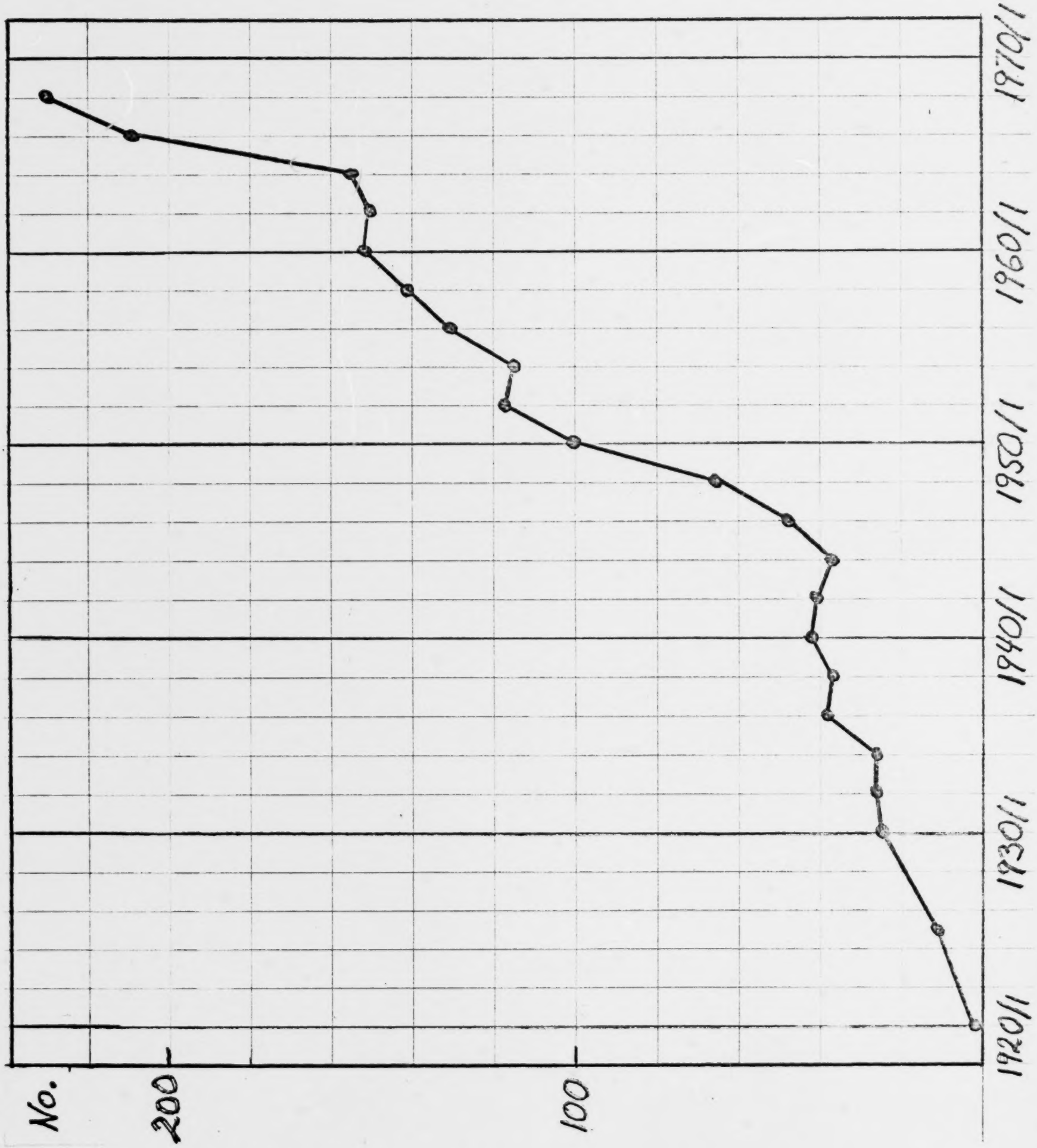

FIG. 2 Number of publications per year in psychological gerontology.

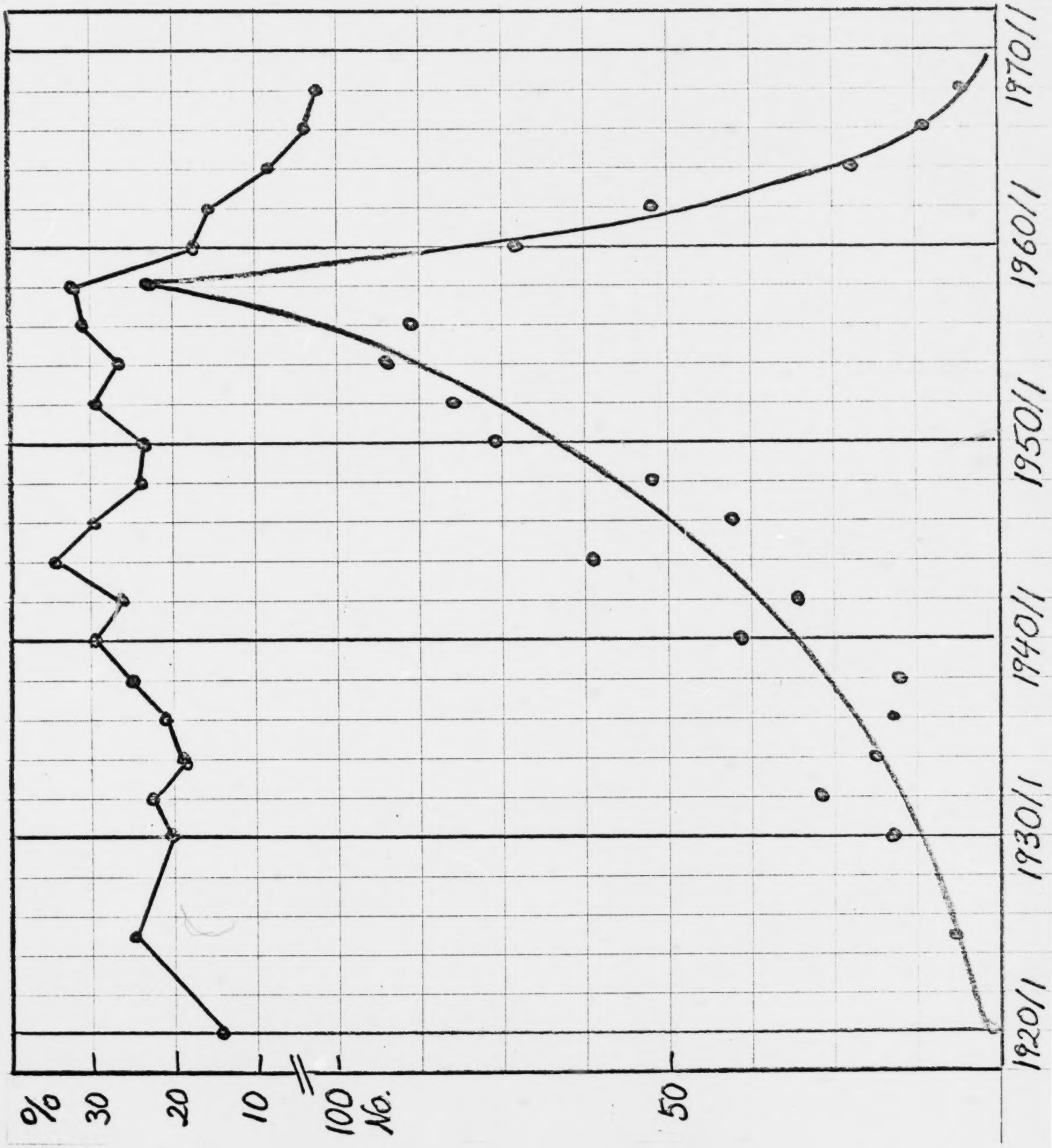

FIG. 3 Number and percentage of publications retrieved from the reference file as a function of time.

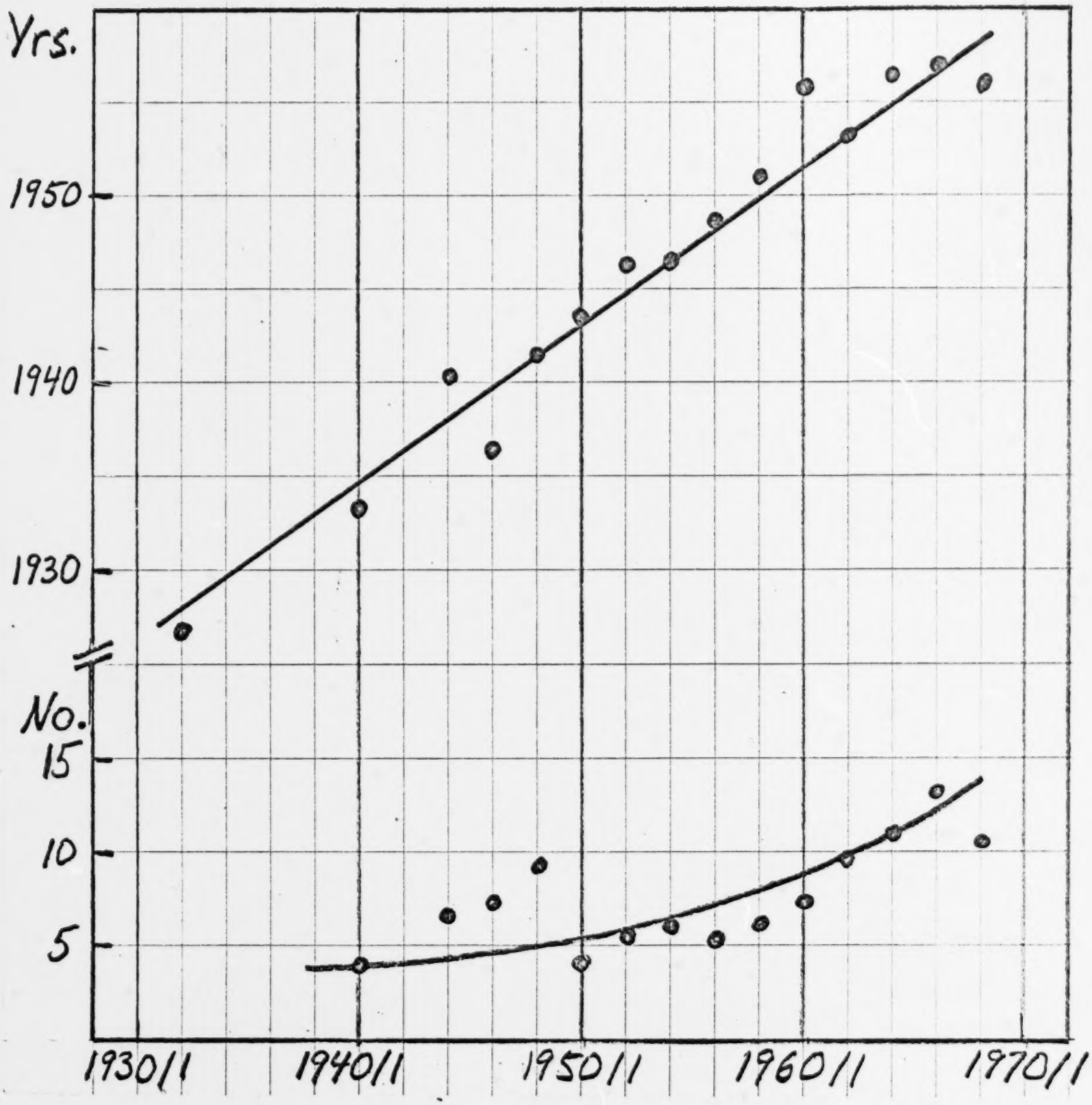

FIG. 4 Average number and years of publications cited as a function of time.

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